Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the subject application.

Listing of Claims:

1. (cancelled)

2. (cancelled)

3. (cancelled)

4. (cancelled)

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16. (cancelled)

17. (cancelled)

18. (cancelled)

19. (original) A multi-generator system for producing ultrasound at selected different frequencies within a processing tank of the type including one or more transducers, comprising:

a generator section having a first generator circuit for producing first ultrasonic drive signals over a first range of frequencies and a second generator circuit for producing second ultrasonic drive signals over a second range of frequencies, the generator section having an output unit connecting the drive signals to the transducers, each generator circuit having a first relay initiated by a user-selected command wherein either the first or the second drive signals are connected to the output unit selectively.

20. (currently amended) A system of claim 19 further comprising a 24 VDC supply to provide power for the relays ~~relay coils~~.

21. (original) A system of claim 19, each generator circuit further comprising a second relay for energizing the circuit, and further comprising two time delay circuits, the first time delay circuit delaying generator circuit operation over a first delay period from when the second relay is energized, the second time delay circuit delaying discontinuance of the first relay over a second delay period after the generator circuit is commanded to stop, the first delay period being longer than the second delay period such that no two generators circuits operate simultaneously and such that all generator circuits are inactive during switching of the first relay.

22. (currently amended) A system of claim 21, further comprising one of a PLC, a computer, or a selector switch for selecting an operating generator circuit by way of supplying a reference voltage to the two relays of the operating generator circuit.

23. (currently amended) A system of claim 22, wherein each relay ~~coil~~ operates at a common reference voltage.

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83. (new) A multi-generator system for producing ultrasound at selected different frequencies within a processing tank, comprising:

a generator section having:

a first generator circuit for producing first ultrasonic drive signals over a first range of frequencies; and

a second generator circuit for producing second ultrasonic drive signals over a second range of frequencies;

wherein the generator section includes an output unit for providing the drive signals to one or more devices, and each generator circuit includes a first relay initiated by a user-selected command, wherein either the first or the second drive signals are connected to the output unit selectively.

84. (new) A system of claim 83 further comprising a 24 VDC supply to provide power for the relays.

85. (new) A system of claim 83, each generator circuit further comprising a second relay for energizing the circuit, and further comprising two time delay circuits, the first time delay circuit delaying generator circuit operation over a first delay period from when the second relay is energized, the second time delay circuit delaying discontinuance of the first relay over a second delay period after the generator circuit is commanded to stop, the first delay period being longer than the second delay period such that no two generators circuits operate simultaneously and such that all generator circuits are inactive during switching of the first relay.

86. (new) A system of claim 85, further comprising one of a PLC, a computer, or a selector switch for selecting an operating generator circuit by way of supplying a reference voltage to the two relays of the operating generator circuit.

87. (new) A system of claim 86, wherein each relay operates at a common reference voltage.

88. (new) A system of claim 83 wherein the multi-generator system is configured to produce ultrasound within a set of defined bandwidths, and one or more of the generator circuits is configured to:

sweep the drive signal from a first frequency to a second frequency during a first defined time period;

switch the frequency of the drive signal from the second frequency to a third frequency; and

sweep the drive signal from the third frequency to a fourth frequency during a second defined time period;

wherein the third frequency is approximately one half bandwidth less than the second frequency.

89. (new) A multi-frequency transducer array capable of producing ultrasound at selected different frequencies within a processing tank, comprising:

a first and second transducer for receiving either a first ultrasonic drive signal over a first range of frequencies or a second ultrasonic drive signal over a second range of frequencies;

wherein the first ultrasonic drive signal results in the first and second transducer producing ultrasound throughout the first range of frequencies; and

wherein the second ultrasonic drive signal results in the first and second transducer producing ultrasound throughout the second range of frequencies.

90. (new) A system of claim 89 further comprising one or more additional transducers for receiving either the first ultrasonic drive signal or the second ultrasonic drive signal.

91. (new) A system of claim 89, further comprising a generator section having a first generator circuit for producing the first ultrasonic drive signal and a second generator circuit for producing the second ultrasonic drive signal, the generator section having an output unit connecting the drive signals to the transducers, each generator circuit having a first relay initiated by a user-selected command wherein either the first or the second drive signals are connected to the output unit selectively.

92. (new) A system of claim 91 further comprising a 24 VDC supply to provide power for the relays.

93. (new) A system of claim 91, each generator circuit further comprising a second relay for energizing the circuit, and further comprising two time delay circuits, the first time delay circuit delaying generator circuit operation over a first delay period from when the second relay is energized, the second time delay circuit delaying discontinuance of the first relay over a second delay period after the generator circuit is commanded to stop, the first delay period being longer than the second delay period such that no two generators circuits operate simultaneously and such that all generator circuits are inactive during switching of the first relay.

94. (new) A system of claim 93, further comprising one of a PLC, a computer, or a selector switch for selecting an operating generator circuit by way of supplying a reference voltage to the two relays of the operating generator circuit.

95. (new) A system of claim 94, wherein each relay operates at a common reference voltage.

96. (new) A system of claim 91 wherein the multi-frequency transducer array is capable of producing ultrasound across a set of defined bandwidths, and one or more of the generator circuits is configured to:

sweep the drive signal from a first frequency to a second frequency during a first defined time period;

switch the frequency of the drive signal from the second frequency to a third frequency; and

sweep the drive signal from the third frequency to a fourth frequency during a second defined time period;

wherein the third frequency is approximately one half bandwidth less than the second frequency.

97. (new) A method of generating a frequency drive signal within a defined frequency bandwidth comprising:

providing a drive signal during a first defined time period, wherein:

the drive signal is provided at a first frequency during a beginning portion of the first defined time period, and

the drive signal is provided at a second frequency during an ending portion of the first defined time period;

varying the frequency of the drive signal from the second frequency to a third frequency; and

providing the drive signal during a second defined time period.

98. (new) A method of claim 97 wherein the third frequency is a defined bandwidth percentage less than the second frequency.

99. (new) A method of claim 98 wherein the defined bandwidth percentage is approximately one half bandwidth.

100. (new) A method of claim 97 wherein the third frequency is a defined bandwidth percentage greater than the second frequency.

101. (new) A method of claim 100 wherein the defined bandwidth percentage is approximately one half bandwidth.

102. (new) A method of claim 97 wherein the bandwidth is approximately 10% of the center frequency of a transducer.

103. (new) A method of claim 97 wherein the first defined time period is within a range defined by ten microseconds and two milliseconds.

104.(new) A method of claim 97 wherein the second defined time period is within a range defined by ten microseconds and two milliseconds.

105.(new) A method of claim 97 wherein the drive signal is an ultrasonic drive signal.

106.(new) A method of claim 97 wherein the drive signal is a microsonic drive signal.

107.(new) A method of claim 97 wherein the first frequency is an upper limit of the bandwidth.

108.(new) A method of claim 97 wherein varying the frequency of the drive signal includes:

switching the drive signal from the second frequency to the third frequency.

109.(new) A method of claim 97 wherein varying the frequency of the drive signal includes:

sweeping the drive signal from the second frequency to the third frequency.

110. (new) A method of claim 97 wherein providing a drive signal during a first defined time period includes:

sweeping the drive signal from the first frequency to the second frequency during the first defined time period.

111. (new) A method of claim 97 wherein providing a drive signal during a first defined time period includes:

stepping the drive signal, via one or more frequency steps, from the first frequency to the second frequency during the first defined time period.

112. (new) A method of claim 97 wherein the first frequency is greater than the second frequency.

113.(new) A method of claim 112 wherein the first frequency is an upper limit of the bandwidth.

114. (new) A method of claim 97 wherein the second frequency is greater than the first frequency.

115.(new) A method of claim 114 wherein the second frequency is an upper limit of the bandwidth.

116. (new) A method of claim 97 wherein the second frequency is essentially equal to the first frequency.

117.(new) A method of claim 97 wherein providing the drive signal during a second defined time period includes:

sweeping the drive signal from the third frequency to a fourth frequency during the second defined time period.

118. (new) A method of claim 117 wherein the third frequency is greater than the fourth frequency.

119. (new) A method of claim 118 wherein the fourth frequency is a lower limit of the bandwidth.

120. (new) A method of claim 117 wherein the fourth frequency is greater than the third frequency.

121. (new) A method of claim 120 wherein the third frequency is a lower limit of the bandwidth.

122. (new) A method of claim 97 wherein providing the drive signal during a second defined time period includes:

stepping the drive signal, via one or more frequency steps, from the third frequency to a fourth frequency during the second defined time period.

123. (new) A method of claim 122 wherein the third frequency is greater than the fourth frequency.

124. (new) A method of claim 123 wherein the fourth frequency is a lower limit of the bandwidth.

125. (new) A method of claim 122 wherein the fourth frequency is greater than the third frequency.

126. (new) A method of claim 125 wherein the third frequency is a lower limit of the bandwidth.

127. (new) A method of claim 97 wherein providing the drive signal during a second defined time period includes:

maintaining the drive signal at the third frequency during the second defined time period.

128. (new) A method of claim 97 wherein providing a drive signal during a first defined time period includes:

changing the frequency of the drive signal randomly from the first frequency to the second frequency during the first defined time period.

129. (new) A method of claim 97 wherein providing the drive signal during a second defined time period includes:

changing the frequency of the drive signal randomly from the third frequency to a fourth frequency during the second defined time period.